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A new species of *Xerocomus* from Southern China

Ming Zhang [1, 2], Tai-Hui Li [1*], Tolgor Bau [2*] & Bin Song[1]

[1]*Guangdong Provincial Key Laboratory of Microbial Culture Collection and Application, Guangdong Open Laboratory of Applied Microbiology & State Key Laboratory of Applied Microbiology (Ministry—Guangdong Province Jointly Breeding Base), South China, Guangdong Institute of Microbiology, Guangzhou 510070, China*

[2]*Jilin Agricultural University, Changchun 130118, China*

[*]Correspondence to: *[1] *mycolab@263.net*, *[2]*junwusuo@126.com*

Abstract — *Xerocomus puniceiporus*, discovered from Heishiding National Nature Reserve in Guangdong province of China, is described as new. The new species is morphologically distinctive because of its small basidioma, greyish ruby to purplish red pileus hairs or scales, reddish purple stipe, and yellow tubes with reddish purple pores. Its rDNA ITS sequence differs from any known sequence of *Xerocomus* and *Boletus*. The holotype is deposited in the Fungal Herbarium of Guangdong Institute of Microbiology (GDGM).

Key word — taxonomy, *Boletales*

Introduction

Xerocomus, which is considered to have a broad concept, is a heterogeneous mixture of several groups of species (Singer 1986, Ladurner & Simonini 2003) and is not monophyletic (Šutara 2008). Some mycologists have incorporated *Xerocomus* into *Boletus*, whereas others still treat it as an independent genus (Watling & Hills 2005, Hills 2008). At least 45 *Xerocomus* species have been reported in China (Bi et al. 1993, 1997; Chiu 1948, 1957; Li & Song 2000, 2003; Teng 1939, 1963; Zang 1996, 2006; Zang et al. 2001, 2002; Zang & Petersen 2004; Zhang et al. 2001). Recently, when tidying the bolete specimens collected from Heishiding National Nature Reserve in Guangdong province of China, we found a species different from any other bolete known from China. It is consistent with the definition of *Xerocomus* following the opinions of Watling & Hills (2005) and Šutara (2008). Further study revealed that as a new species, which we formally describe below. The holotype is deposited in the Fungal Herbarium of Guangdong Institute of Microbiology (GDGM).

Plate 1. *Xerocomus puniceiporus*.
a. Basidiomata. Bar = 20 mm. b. Basidiospores under scanning electron microscope

Materials & methods

Specimens were annotated and photographed in the field, and dried in an electric drier. Colour description was according to Kornerup & Wanscher (1978). Tissue sections were mounted in 5% KOH for microscopic examination. At least 30 basidiospores were measured. Basidiospore dimensions follow the notation (a–)b–c(–d), with b–c representing 90% or more of the measured values and with extreme values "a" and "d" shown in parentheses. Q = length/width ratio of an individual basidiospore, Q_m = average Q of all basidiospores ± sample standard deviation, and n = number of spores measured per specimen.

Genomic DNA was isolated from dried specimens and the ITS1-5.8S-ITS4 segment from the ribosomal DNA (rDNA) was amplified with primer sets ITS1 (5'-CTT GCG TTG ATT ACG-3') and ITS4 (5'-TCC TCC GCT TAT TGA TAT GC-3') by polymerase chain reaction (PCR) techniques. Amplified products were examined with agarose gel electrophoresis using a 2kb DNA marker. The amplified PCR product was directly sequenced and the datum is deposited in GenBank.

Taxonomy

Xerocomus puniceiporus T.H. Li, Ming Zhang & T. Bau, **sp. nov.** Plate1, Fig. 1

MycoBank MB 563347

Differs from *Boletus aokii* by its purplish red pores, nearly unchanging reaction when injured, and small basidiospores.

Type: China, Guangdong Province, Fengkai County, Heishiding National Nature Reserve, 1 July 2010, TaiHui Li & ChunYing Deng (**Holotype**, GDGM 27443; GenBank JF514559).

Etymology: *puniceiporus* refers to the purplish red pore-surface or pore-edge.

Pileus 20–25 mm broad, fleshy, convex to expanded, greyish ruby (12E5) to greyish Magenta (13E5) in the mass, mixed with greyish red (11D5), tomentose to fibrillose or villose, soon becoming areolate, and with tufts of greyish ruby (12E5), greyish Magenta (13E5) to purplish red (13B7) hairs or villose scales on

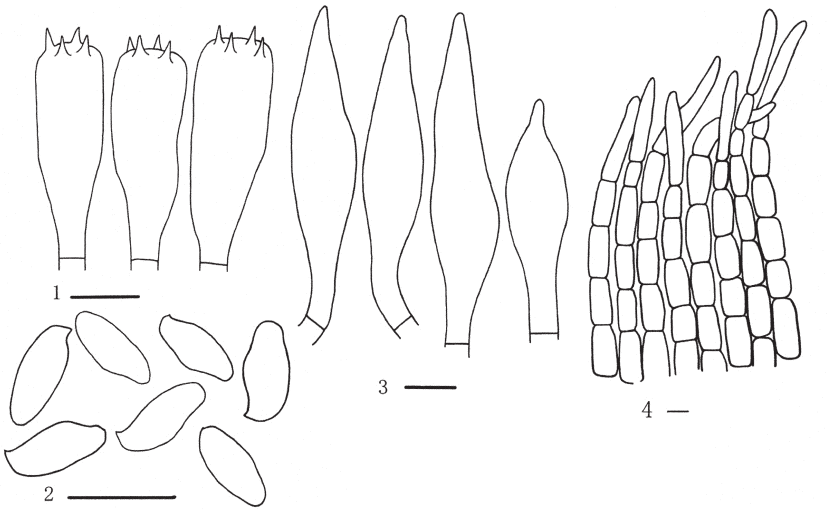

Fig. 1. Microscopic features of *Xerocomus puniceiporus*.
a. Basidia; b. Basidiospores; c. Pleurocystidia; d. Pileipellis. Bars = 10 μm.

surface, not viscid; with a narrow purplish red (13B7) zone and slightly incurved at margin. Exposed background or context nearly white, pinkish white, yellowish white (1A1), pinkish (1A2) to light purplish pink (14A2). Flesh 2.5–4 mm thick at center, soft, white (1A1), nearly unchanging to slightly blueing (21A2, 22A2) when exposed. Tubes 1.5–2.5 mm deep, decurrent, light yellow (2A5), lemon yellow (2B5) to greenish yellow (2C6), pores 1–2 mm wide, angular, somewhat radially elongated or lamellate close to stipe, with a very narrow purplish red (13A7) pore-surface or edge. Stipe 20–27 × 2–3 mm, central, cylindrical, equal to slightly enlarged downwards, purplish red to magenta (13B7, 13C7), with purplish red furfuraceous scurfs, slightly or obscurely striate, solid, brittle, with white mycelium at base; stipe context white (1A1), nearly unchanging to slightly blueing (21A2, 22A2) when exposed.

Basidiospores (7.2–)7.8–9.8(–10.6) × (3.5–)3.9–4.3(–4.8) μm, Q = (1.88–)2.0–2.33(–2.51), $Q_m = 2.20 \pm 0.15$, n = 30, ellipsoid to ellipsoid-fusiform, smooth, pale yellowish brown to olive yellow, thin-walled. Basidia 4-spored 27.0–35.0 × 7.5–11.0 μm, clavate, hyaline to yellowish white; sterigmata 1.4–2.7 μm long. Pleurocystidia 48.0–70.0 × 12.0–15.0 μm, fusoid ventricose to fusoid, thin-walled, with hyaline to yellowish. Hymenophoral trama subparallel to nearly bilateral type with hyphae of the lateral strata loosely arranged, hyaline to yellowish, 7.8–15 μm broad. Pileipellis composed of tufts of erect hyphal elements 9.8–13.2 μm broad, but initially a characteristic palisadoderm, with brownish yellow to yellowish. Clamp connections absent in all tissues.

Ecology and Distribution — Solitary or scattered on soil with humus and debris under conifers mixed with other broadleaf trees; June to July. Only known from the type locality in South China (Guangdong).

Comments — According to Šutara (2008), *Xerocomus* s.l. can be divided into five genera as *Xerocomus* s. str., *Phylloporus*, *Xerocomellus*, *Hemileccinum,* and *Pseudoboletus*. Following this classification, our new species would be placed in Šutara's *Xerocomellus* based on the smooth as observed under the scanning electron microscope (Plate 1b), the hymenophoral trama comprises an intermediate structure between the boletoid and phylloporoid types with hyphae of the lateral strata not touching each other, and the pileipellis at the initial stage is composed of a characteristic palisadoderm (Šutara 2005, 2008). However, when compared with the other species within *Xerocomellus* group possessing a similar cracking pileus and large angular pores, *Xerocomus puniceiporus* can be distinguished from other species by the combination of small basidiomes with greyish ruby to purplish red hairs or scales on the pileus, yellow tubes with purplish red pores, nearly unchanging to slightly blueing context, and purplish red scurfs on the stipe. Among the other bolete groups, *Boletus aokii* Hongo macroscopically resembles the new species to some extent in size, pileus colour, yellow tubes, and angular pores, but it has longer basidiospores (9–13.5 × 4–5 μm), yellow pores, and a noticeable blueing reaction on tubes and flesh when injured (Hongo 1984, Zang 2006).

The nrDNA-ITS sequence (660 bp) of *X. puniceiporus* (JF514559) differs from any known sequences of *Xerocomus* and *Boletus*. A Blast search of GenBank produced as the closest matches several unknown *Xerocomus* species (AY372287, AY372285, DQ066413, DQ066412, DQ066378), with only 87% maximal identities. Therefore, we distinguish *Xerocomus puniceiporus* as a new species based on both morphological and molecular characters.

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